ORIGINAL ARTICLE

Knowledge of Elementary Education students about HPV in a municipality from the Western Mesoregion of the State of Maranhão

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ABSTRACT

Fundamentals: Human Papillomavirus (HPV) is the etiological agent of one of the most common Sexually Transmitted Infections (STIs) worldwide, affecting men and women who are sexually active. Lack of information about STIs, ignorance about vaccines, and the absence of discussions on sexual education in schools are potential factors influencing adolescents and young people to engage in risky situations related to HPV. **Objective:** This study aimed to analyze students' knowledge in the public Elementary Education system regarding STIs, especially HPV transmission, in the municipality of Zé Doca, state of Maranhão. **Methodology:** It is a descriptive cross-sectional study with a population of students from three public schools. A semi-structured questionnaire was used to assess knowledge about HPV transmission, and it was administered to 200 students from the 9th grade of Elementary school and the 1st, 2nd, and 3rd years of high school. **Results:** In the statistical analysis, it was observed that 3rd-year students demonstrated greater knowledge about HPV ($p < 0.001$), higher frequency of prior sexual activity ($p = 0.039$), better understanding that HPV constitutes a relevant risk factor for cancer development ($p < 0.001$), and higher vaccination coverage ($p = 0.015$). Regarding vaccination, 36.0% of respondents reported having received at least two doses of the vaccine. In order to promote health education with a focus on sexual education, lectures were conducted in schools, and educational materials were produced and disseminated on social media to expand access to official information about HPV prevention. **Conclusion:** The data analysis revealed that most students exhibit knowledge gaps regarding the biological, epidemiological, and social aspects of STIs, including HPV, as well as the available protective measures. This scenario highlights the need to implement health education strategies within the scope of sexual education, in order to enhance young people's understanding of prophylactic practices. Such an approach is essential to reduce transmission rates and to minimize the epidemiological and psychosocial impacts associated with these diseases. We also emphasize that health education and sexual education actions in school settings should be prioritized in a scientific, critical, secular, problematizing, and civic manner so that individuals can achieve the objectives advocated by the World Health Organization regarding comprehensive health.

Keywords: Sexually transmitted infections, HPV, Prevention of transmissible diseases, Health education, Adolescents.

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FUNDAMENTALS

Sexually transmitted infections (STIs) result from infections by viruses, bacteria, and protozoa, primarily transmitted through sexual contact without the use of any barrier protection with an already infected person [1]. The most common STIs in the country include chlamydia, gonorrhea, HPV infection, genital herpes, trichomoniasis, syphilis, and HIV/AIDS [2].

According to the World Health Organization (WHO) [3], it is estimated that over 1 million cases of STIs are acquired daily. In 2020 alone, the WHO estimated there would be 374 million new infections worldwide. In Brazil, this increase is attributed to the proportion of people who do not use condoms during sexual relations and other risks, such as mother-to-child transmission during pregnancy, childbirth, or breastfeeding. According to the Ministry of Health [2], approximately 60% of Brazilians aged 18 do not use condoms during sexual relations.

Some STIs are asymptomatic, complicating any diagnosis [4]. When not properly treated, these infections can cause serious health problems such as infertility, congenital malformation, and systemic infections, among others, potentially leading to death [5].

Among STIs, we highlight infection by Human Papillomavirus (HPV), a double-stranded circular DNA virus responsible for causing multiple epithelial lesions like cutaneous and anogenital warts [6]. Regarding HPV types, there are over 100, out of which 13 are associated with malignant neoplasms, known as high-risk HPVs, with emphasis on types 16 and 18 [7], as they are the most frequent in cases of cervical cancer [8], vulvar cancer [9], vaginal cancer [10], and oral cancer [11].

According to an epidemiological study [12], the HPV infection rate reached 54.6% between 2016 and 2017. This high rate was mainly observed among young people who have a high number of partners and do not use condoms during sexual intercourse. Additionally, it was found that the majority of young people and/or adolescents lack knowledge about HPV and fail to associate this virus with a sexually transmitted infection [13]. Therefore, it is crucial to educate them about the transmission methods and best prevention practices of HPV and other STIs. By doing so, we can raise awareness among this population and prepare them to deal with adverse situations related to STIs [14].

Although the effectiveness of HPV vaccination is proven, Brazil shows a low continuity rate in the immunization cycle, especially among the young population [15]. This stems from the lack of information regarding the importance of vaccination and the scarcity of sexual education programs in schools. In other words, ignorance leads adolescents and/or young individuals into a risky situation that could be avoided [16].

Considering the high incidence of HPV among young people, their low adherence to the immunization cycle, and the lack of sexual education in schools, the following research problem arises: What is the knowledge of students about STIs/HPV in schools in the municipality of Zé Doca, state of Maranhão?

Answering this question can assist in developing effective intervention measures with the mentioned population, as it is crucial to understand the extent of ignorance about STIs/HPV in order to act towards reducing the transmission chain of HPV.

METHODOLOGY

Study Area and Target Audience

The present study was conducted in the municipality of Zé Doca, in the state of Maranhão, with a territorial area of 2,140.109 km² and a population of 40,801 inhabitants [17]. The municipality is located in the Western Mesoregion of the state of Maranhão, at a distance of 325 km from the capital, São Luís.

The study population consisted of 200 students of both sexes, aged between 14 and 20, enrolled regularly.

Research Characterization and Research Instrument

This was a descriptive cross-sectional exploratory study with a quantitative approach[18, 19]. Research procedures included literature review and field research. A semi-structured questionnaire with closed-ended questions was used as the data collection instrument, aiming to assess students' knowledge about HPV. This questionnaire allowed for an initial diagnosis and identification of learning needs and assisted in developing subsequent educational activities.

Ethical Considerations

Students from primary education schools who consented to participate in the proposed activities and signed the Informed Consent Form (ICF) were included in this research for those aged 18 and older. Minors under 18 years old were also included in the study, with their legal guardians signing the Informed Consent Form (ICF) and the minors themselves signing the Minor's Informed Assent Form (IAF). The Research Ethics Committee approved the research, CAAE No. 46888321.3.0000.5554, at the State University of Maranhão.

Data Analysis

Data obtained from the questionnaires were tabulated in Microsoft Excel spreadsheets (Washington, United States of America) and analyzed using SPSS software version 23 (Chicago, United States of America). Absolute and relative frequencies were presented in the form of tables and graphs. Microsoft Word and Microsoft Excel softwares (Washington, United States of America) were used for table editing. Quantitative variables were presented using frequencies and percentages. The data were subjected to the Shapiro-Wilk test to assess normality. Association analysis was conducted using the Chi-square test, utilizing SPSS software version 23. The significance level adopted for all analyses was set at $p \leq 0.05$. Association testing was performed to assess students' understanding levels regarding the following variables: gender, school year, history of sexual activity, family income, source of information, HPV comprehension, vaccination status, and parental education level.

RESULTS

Participants in this research included 200 students aged between 14 and 20 years, with the majority being female (59.0%; n = 118). The reported family income was mostly one minimum wage (69,5%; n = 139), and parents exhibited low educational attainment. Based on data observation, a significant portion of respondents (52%; n = 104) demonstrated specific characteristics (Table 1).

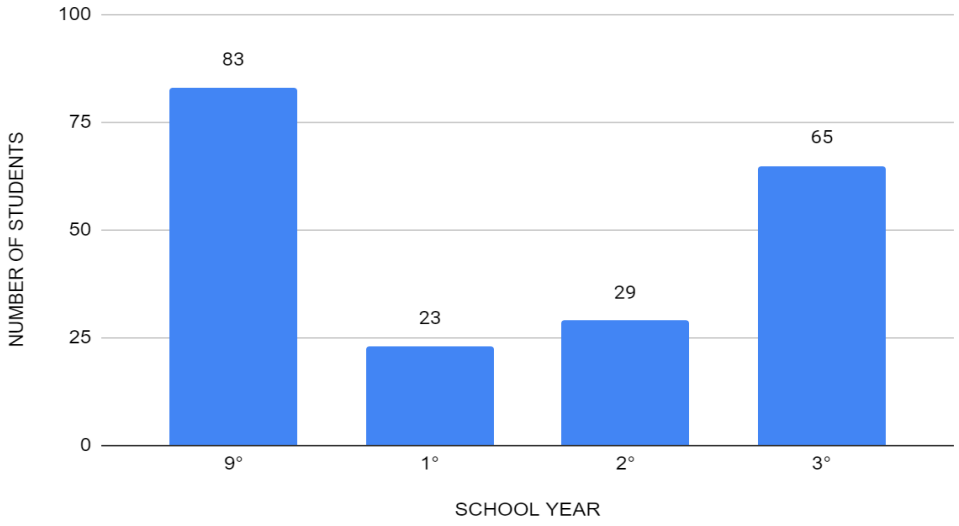
Table 1: Characterization of participating adolescents by sex, family income and parental education.

Variables	N (%)
Gender	
Female	118 (59,0%)
Male	82 (41,0%)
Family income	
Up to 1 Minimum Wage	139 (69,5%)
2 to 3 Salaries	51(25,5%)
Not Reported	10(5%)
Parental education	
Illiterate	1(0,5%)
Up to Elementary School (Incomplete)	103(51,5%)
Up to Middle School (Incomplete)	71(35,5%)
Up to Higher Education (Incomplete)	19(9,5%)
Not Reported	6(3%)

Source: Authors, 2024.

Among the study participants, 41.5% (n = 83) were enrolled in the 9th grade of elementary school, followed by students in the 12th grade of high school with 32.5% (n = 65) and the 11th grade with 14.5% (n = 29). Lower participation was observed among students in the 10th grade (1st year) (11.5%; n = 23) (Graph 1).

Graph 1: Distribution of participating students from primary education schools in Zé Doca, Maranhão.



Source: Authors, 2024.

Regarding the onset of sexual activity, 50% (n = 100) of the respondents reported not yet engaging in sexual activity. Among those who mentioned having started sexual activity, they did so between the ages of 13 and 15 years old (n = 58; 64.4%), of whom 54.6% (n = 53) stated that they did not use contraceptive methods during their first sexual encounter (Table 02).

As for the main transmission route of STIs, 79.5% of students indicated sexual routes, including vaginal, oral, and anal. As for adolescents' knowledge on the topic, 46% (n = 92) reported having some primary notions, especially regarding AIDS (37.4%; n = 37), HIV (21.2%; n = 21), HPV (20.2%; n = 20), syphilis (13.1%; n = 13), gonorrhea and genital herpes (3%; n = 3), and chlamydia (2%; n = 2) (Table 02).

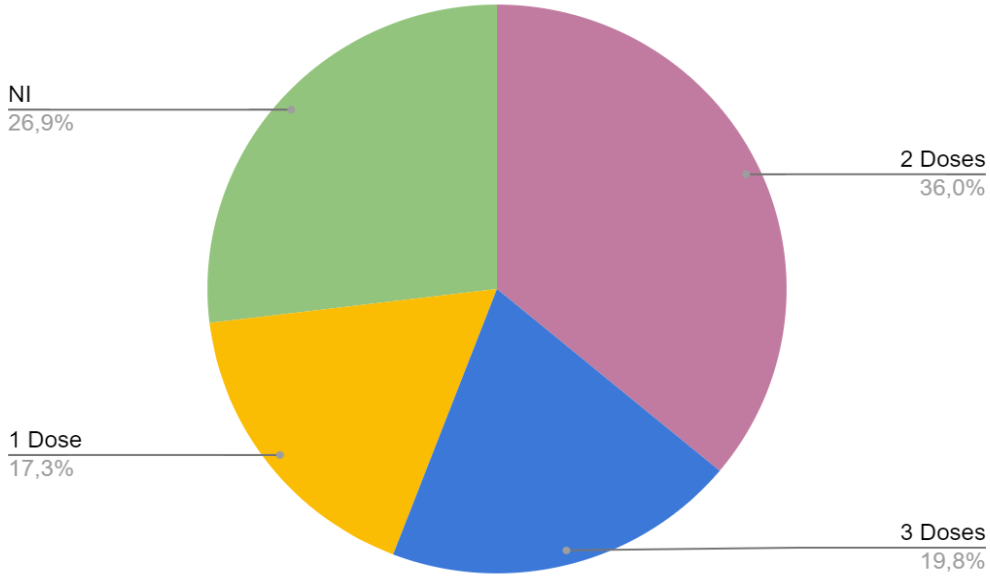
Table 2: Participants' responses regarding sexual activity, transmission route, and knowledge about STIs from primary education schools in the municipality of Zé Doca, state of Maranhão.

Variables	N (%)
Sexual Activity	
Yes	100(50%)
No	100(50%)
Transmission Routes of STIs	
Vaginal/Oral/Anal Sex	159(79,5%)
Contaminated Underwear	8(4%)
Hugs and Handshakes	7(3,5%)
From Mother to Child during Pregnancy	8(4,0%)
Contact with Sores	14(7%)
Not Reported	4(2%)
Knowledge about STIs	
Yes	92(45%)
No	88(44%)
Not Reported	20(10%)

Source: Authors, 2024.

When asked if HPV infection is an STI, 71% (n = 142) affirmed that it is. These respondents also emphasized that the virus represents a significant risk factor for cancer development. Regarding HPV vaccination, 71.5% (n = 143) of the interviewees reported having been vaccinated against the virus, with only 19.8% (n = 39) receiving all three doses of the vaccine, thus completing the immunization cycle (Graph 2).

Graph 2: Data concerning the Number of doses received by students from primary education schools in the municipality of Zé Doca, state of Maranhão.

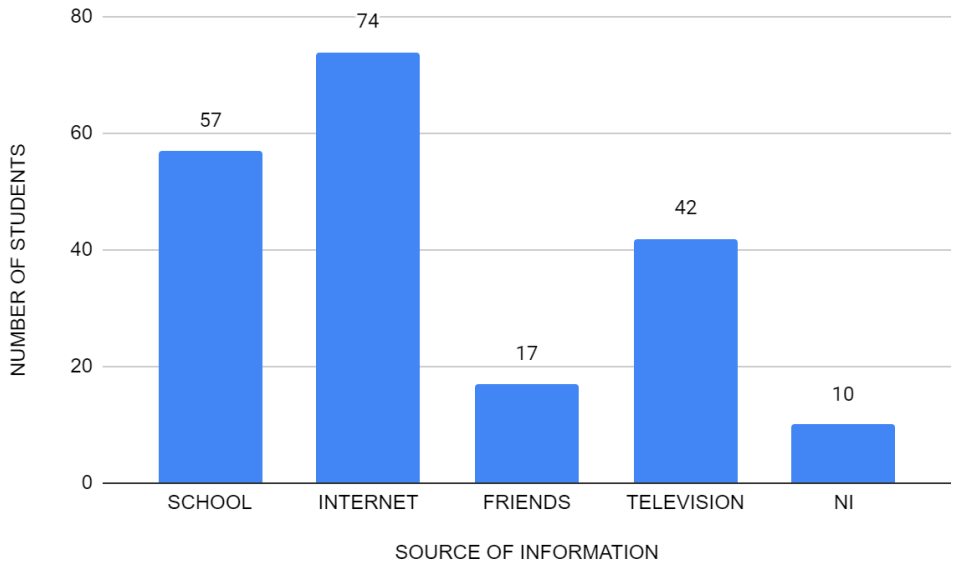


NI* Not informed.

Source: Authors, 2024.

Many respondents stated that they obtained information about STIs online (37.1%; n = 74), using it as a source to clarify their doubts (Graph 03).

Graph 3: Source of information for respondents about STIs from primary education schools in the municipality of Zé Doca, state of Maranhão.



NI* Not informed.

Source: Authors, 2024.

Association tests were conducted to assess students' knowledge about HPV as an STI about the following variables: gender, grade level, sexual activity, family income, information source, understanding of HPV as an STI, vaccination status, and parental education level (Table 3). It was observed that a high percentage of 12th-grade students were aware that HPV is a risk factor for cancer ($p < 0.001$), had engaged in sexual activity ($p = 0.039$), understood that HPV was a significant risk factor for cancer development ($p < 0.001$), and had already been vaccinated ($p = 0.015$).

Table 3: Association between knowledge about HPV as an STI and the characteristics of interviewees from primary education schools in the municipality of Zé Doca, state of Maranhão.

Variables		Knowledge about HPV		p
		Yes	No	
Gender N=189	Female	84 (74,3%)	29 (25,7%)	0,96
	Male	58 (76,3%)	18 (23,7%)	
Grade Level N=189	9th grade.	57(76%)	18(24%)	< 0,001*
	1st Year of High School	7(30,4%)	16(69,6%)	
	2nd Year of High School	23(79,3%)	6(20,7%)	
	3rd Year of High School	55(88,8%)	7(11,2%)	
Have you ever had sexual intercourse? N=189	Yes	79(81,4%)	18(18,6%)	0,039*
	No	63(68,5%)	29(31,5%)	
Family Income N=184	Up to 1 Minimum Wage	105(78,4%)	29(21,6%)	0,146
	2 to 3 Minimum Wages	34(68%)	16(32%)	
Source of Information N=186	School	44(75,9%)	14(24,1%)	0,078
	Internet	61(83,6%)	12(16,4%)	
	Friends	10(66,7%)	5(33,3%)	
	Television	25(62,5%)	15(37,5%)	
Is HPV a risk factor for cancer? N= 189	Yes	116(81,7%)	26(18,3%)	< 0,001*
	No	17(44,7%)	21(55,3%)	
Have you been vaccinated? N=190	Yes	116(80,6%)	28(19,4%)	0,015*
	No	29(63%)	17(37%)	
Number of Doses	1 dose	21(65,6%)	11(34,4%)	0,909
	2 doses	44(67,7%)	21(32,3%)	
	3 doses	24(70,6%)	10(29,4%)	
Parental Education Level N=167	Low education	58(71,6%)	23(28,4%)	0,839
	Up to completed High School	51(70,8%)	21(29,2%)	
	Up to completed Higher Education	11(78,6%)	3(21,4%)	

Source: Authors, 2024.

Educational Actions in Schools and Media Outlets

Educational activities were conducted in schools, including displaying informative posters about HPV and hosting discussion circles with students where they could express their doubts and share their knowledge on the topic. Based on the data analysis, a booklet was developed to disseminate information and raise adolescent awareness about the most common STIs. This booklet contains scientific information about STIs, covering clinical, pathogenic, diagnostic, treatment, and prevention aspects. Information about HPV was also disseminated to the community through Instagram posts on the profile titled 'Grupo de Pesquisa em Saúde' (Health Research Group).

DISCUSSION

The data from this study indicate that students assessed in the city of Zé Doca, state of Maranhão, initiated sexual activity around the age of 14, which is consistent with previous literature on the early onset of sexual activity [20, 21]. Furthermore, adolescents who had already engaged in sexual relations (64.4%) reported not using condoms or other contraceptive methods. Women demonstrated greater knowledge than men, particularly regarding the use of condoms and other contraceptives. Therefore, the lack of condom use or other contraceptive methods may be related to unawareness of their importance, potentially facilitating the onset of an STI during adolescence [22].

71.6% of students reported that their parents had low educational attainment in terms of parental education. This is essential, as it may impact communication between parents and children. The low educational level of guardians may hinder obtaining information about sexuality and measures for preventing STIs/HPV [23].

Regarding students' knowledge about STIs, although the majority claimed familiarity with the topic, it is essential to highlight that 10% of participants were not familiar with the subject. These data suggest that misinformation reflects the absence or inadequacy of public policies aimed at ensuring the dissemination of information to prevent STIs and related diseases, especially within schools, highlighting a public health issue. Public health policies targeting human health aim to provide clear and accurate information directed toward young people and adolescents, whether in a school or family setting [24]. Thus, the scarcity of this information makes them more vulnerable to exposure to infections of any nature, including STIs.

About the most cited STI, AIDS prevailed. This fact may be linked to the dissemination of informational campaigns about HIV/AIDS aimed at reducing risky behaviors. However, there remains a deficit in knowledge regarding prevention, transmission, and the consequences of this STI, as well as others mentioned by the participants in this research.

Based on the data from this study, it is evident that adolescents are acquiring information about sex, sexuality, STIs, and modes of transmission primarily through the internet (36%). However, unsupervised internet access without prior knowledge can lead adolescents to access content with distorted information about sex and sexuality [25]. The limitation in family dialogue prompts adolescents to seek information from other sources, contributing to the dissemination of misinformation and increasing vulnerability to infections, unwanted pregnancies, and other adversities that may compromise the safety of young individuals [26].

It is noticeable how the topic of sexuality remains taboo in society, and the lack of dialogue in families, schools, or any social group can generate misinformation, directly affecting the lives of adolescents [27]. The implementation of sexual education in schools helps children and adolescents gain a comprehensive understanding of STIs, raising awareness about preventive actions

and responsible approaches to sexuality [28].

Since 2014, the HPV vaccine has been available through the Unified Health System (SUS) in Brazil, yet its uptake remains low despite accessibility to both girls and boys. Despite being an effective and essential method for preventing cervical cancer in Brazil, adolescents demonstrate reluctance to continue the vaccination cycle [29]. According to the DATASUS database, in 2015, in the state of Maranhão, the vaccination rate among girls aged 9 to 12 who completed the vaccination cycle was only 0.07%. This may reflect a lack of information among adolescents and their families about the importance of vaccination.

Regarding knowledge about HPV, the majority of respondents (81.7%) reported that the virus causes an STI. However, it was noted that many students were unaware of the leading causes of infection, such as the presence of epithelial lesions and related malignancies. Therefore, there is a need to intensify educational efforts to expand the spectrum of information about the virus and preventive measures and enhance campaigns emphasizing the importance of vaccination [30]. Such measures can help reduce the incidence of HPV-related cancers, especially cervical cancer, which is a leading cause of mortality among women, particularly in developing nations like Brazil [31].

In another study conducted by Osis *et al*. (2024) involving 86 women (aged 18 to 49 years) and 252 men (aged 18 to 60 years), it was observed that less than half of the analyzed population (40%) knew about HPV and about 25% of those with some knowledge still needed improvement. This underscores the need to popularize knowledge about STIs [32].

This study faced several limitations, such as some schools refusing to allow lectures and the distribution of booklets to students who responded to the questionnaires. Additionally, there was limited time available for lectures with students and a lack of information provided by the municipality regarding HPV vaccination coverage.

It is essential to assess the population's level of knowledge about HPV, as this enables the evaluation and selection of appropriate strategies based on the results obtained, aiming to develop effective programs that include promotion, prevention, and diagnosis measures for virus-induced alterations.

The results of this study highlight the urgent need to implement comprehensive educational strategies that involve both families and schools and to improve awareness campaigns on sexual and reproductive health. It is crucial to adopt multidisciplinary and accessible approaches to provide accurate information and promote healthy behaviors among young people and their communities.

CONCLUSION

Upon examining the data, we can clearly observe that the investigated adolescents demonstrated limited knowledge about STIs, particularly regarding HPV infection. Factors contributing to this issue include a lack of information about STIs and the underutilization of protective methods, which are structural factors of vulnerability to these infections.

Therefore, it is essential for school administrators, in collaboration with municipal public agencies and families, to develop informative strategies. The objective is to raise awareness among the student community about the importance of safe sexual practices, with a focus on HPV prevention through vaccination. Sexual education emerges as a critical strategy to inform and raise awareness among the general population about the significance of safe sexual practices.

In light of this, it is essential to implement health education strategies, especially in sexual education, aimed at

expanding information on preventive measures against STIs. The goal is to reduce transmission rates and address the epidemiological and psychosocial problems associated with these diseases. Furthermore, there is a need to prioritize health education and sexual education initiatives in school environments in a scientific, critical, secular, problem-oriented, and citizen-focused manner. This approach aims to empower individuals to achieve the objectives the World Health Organization advocates for comprehensive health promotion.

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Critical text revision: JDP, JMTB, JRSS
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Conflict of interest

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